

III. REMARKS

In the Office Action, claims 1-3 and 6-10 were rejected under 35 U.S.C. 103 as being unpatentable over Koonen (US 6674966) in view of Eddy (US 2005/0026588) and Ames (US 5371814) for reasons set forth in the Action.

Also, Other ones of the claims were also rejected under 35 U.S.C. 103 as being unpatentable over various combinations of the cited art, namely, claims 4 and 11 over Koonen in view of Eddy and Ames and Cheong (US 6477154), claim 12 over Koonen in view of Eddy and Owens (US 2004/0264446), claims 13, 15 and 16 over Koonen in view of Ye (US 6782199), claim 14 over Koonen in view of Ye and Ames, claims 17 and 20 over Koonen in view of Eddy and Ames and Cheong, and claims 18-19 over Koonen in view of Eddy, Ames, Cheong, and Ballance (US 4977593) for reasons set forth in the Action.

Various ones of the claims are amended in order to distinguish the claims further from the teachings of the cited art, thereby to overcome the foregoing rejections. The independent claims 1, 12, 13 and 17 have been amended to emphasize a feature of the present invention that, whereas the RF equipment in the shelter is temperature sensitive, the components of the antenna assembly do not have the temperature sensitivity of the RF equipment in the shelter. The separation of the temperature sensitive and temperature insensitive components is made possible by the capability of the fiber optic link to carry RF signals. Claim 13 is amended further to clarify a passage of the claim, and claim 17 is amended further for uniformity of terminology in the claim.

The following argument is presented to overcome the rejections and to show the presence of allowable subject matter in the claims.

As described in the previous response, an important aspect of the invention is explained in the Background of the Invention and the Summary of the Invention on pages 1-3 of the present specification. In the paragraph linking pages 1 and 2, it is taught that various radio frequency (RF) components are susceptible to temperature and moisture. This type of equipment is referred to in the specification as sensitive equipment. The specification teaches that it has been the practice in the prior art to locate such sensitive equipment at the antenna. This may require an air-conditioned enclosure (page 1 at lines 16-17; page 2 at lines 2-5). Such an arrangement of the system components also creates servicing difficulties wherein it may be necessary for personnel to travel under adverse weather conditions to the antenna to service the sensitive equipment.

To avoid the foregoing disadvantage of the prior art, and to facilitate the construction and operation of such as antenna, the present invention locates the radio frequency equipment in a shelter, located at a distance from the antenna, rather than directly at the antenna (specification, page 5 at lines 6-8). On the other hand, other equipment (non-sensitive equipment) that is able to withstand extreme temperature and moisture, such as amplifiers, transmitters and receivers, is located adjacent the feed of the antenna (specification, page 8 at lines 14-25) wherein, as is well known, the close positioning between these elements and the feed preserves desired signal characteristics.

Thus, in the practice of the invention, while it is recognized that temperature non-sensitive equipment such as amplifiers,

transmitters and receivers should be placed close to the antenna feed to insure high signal quality, it is also recognized that certain temperature sensitive signal processing equipment can be located away from the antenna to facilitate servicing if the non-sensitive equipment connects to the sensitive equipment via a suitable communication link, namely, the fiber optic link disclosed in the present specification.

In the present specification, in the paragraph linking pages 1-2, there is a discussion of RF components which, when mounted within the enclosure of an antenna, require environmental protection. The specification specifically lists synthesizers, up-converters and down-converters as having a temperature sensitivity that would necessitate such environmental protection. Furthermore, on page 1 at line 12, the specification discloses the outdoor temperature range required of RF equipment, the range being minus 55 degrees centigrade to plus 85 degrees centigrade. Thus, in the teaching of the invention in the specification, it is understood that equipment that cannot operate within the entire range of the foregoing temperatures is designated as being temperature sensitive, and is protected within the shelter. In contrast, the equipment that is capable of operating over the entire temperature range may be placed in the antenna assembly and is designated as equipment (or components) that do not have the temperature sensitivity of the RF equipment in the shelter. As noted above, the foregoing distinction is emphasized in the amendments to the independent claims.

With respect to the rejection of claim 1, it is urged that the teachings of Koonen are misapplied in the comparison of the present invention to the teachings of the cited art.

On page 2 of the Office Action, the examiner refers to element 74a of Koonen as being an antenna assembly located apart from RF equipment. In fact, element 74a is a transceiver station having an antenna 36a depicted as being a part of the transceiver station, and not being located away from the transceiver station.

In the middle of page 2, the examiner discusses sensitive radio frequency equipment. However, this term does not appear in claim 1, rather a sensitivity to temperature is disclosed in the claim.

In Koonen, Fig. 4 in conjunction with text in col. 5 at lines 27-51, there is discussion of the electric signals at an antenna, and the conversion between the electric signals and the optical signals. Since the frequencies of the optical signals are much higher than the microwave signals, the optical signals may be modulated at the microwave signals, but there is no disclosure of this in Koonen. In col. 6 at lines 5-18, there is discussion of analogue microwave signals with electrical frequency up-conversion and down-conversion for transfer of intelligence, and transporting them in analogue way along the fiber feeder network. Further, in col. 9, at lines 31-35, there appears to be an association between a carrier frequency at the antenna and wavelengths in an optical channel (shown in Fig. 7A). From the foregoing observations, it is not clear whether the RF, in terms of the microwave carrier frequency, or in terms of modulation placed on the microwave carrier, is communicated via the optical channels in Koonen. It is believed that this reference is too indefinite for purpose of showing the RF fiber optic communication of the present invention.

The foregoing passage of Koonen in col.6 at lines 5-18, where there is discussion of analogue microwave signals with electrical frequency up-conversion and down-conversion, shows that Koonen is teaching the use of the conversion circuitry at the antenna assembly. It is recalled that, in the foregoing argument, reference was made to the present specification, in the paragraph linking pages 1-2, wherein there is a discussion of RF components which, when mounted within the enclosure of an antenna, require environmental protection. The specification specifically lists up-converters and down-converters as having a temperature sensitivity that would necessitate environmental protection. This contradicts the teaching of Koonen for placing such temperature sensitive equipment at the antenna.

Also, with respect to an amplifier assembly, the Examiner (Action, paragraph linking pages 3-4) relies on the disclosure of Eddy. However, Eddy has a US filing date in the year 2003 based on a parent application filed in 2002, while the present application has a filing date in 2001, well before Eddy. Thus, Eddy is not a proper reference on which to base a rejection of the claims.

It is requested that the finality of this Action be withdrawn, so that the examiner can provide a substitute reference of earlier date, or alternatively, to allow the claims. It is noted that Eddy, in combination with other ones of the references, is employed in the rejection of all of the independent claims.

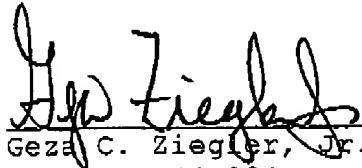
The foregoing argument with respect to claim 1 applies also to other ones of the independent claims. The citations of art for the dependent claims does not alter the foregoing argument.

In view of the amendment and argument herein, it is believed that the rejections have been overcome so as to obtain allowable subject matter in the claims.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,



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22 Feb 2006

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